

The Sensory System

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Functions of the Sensory System

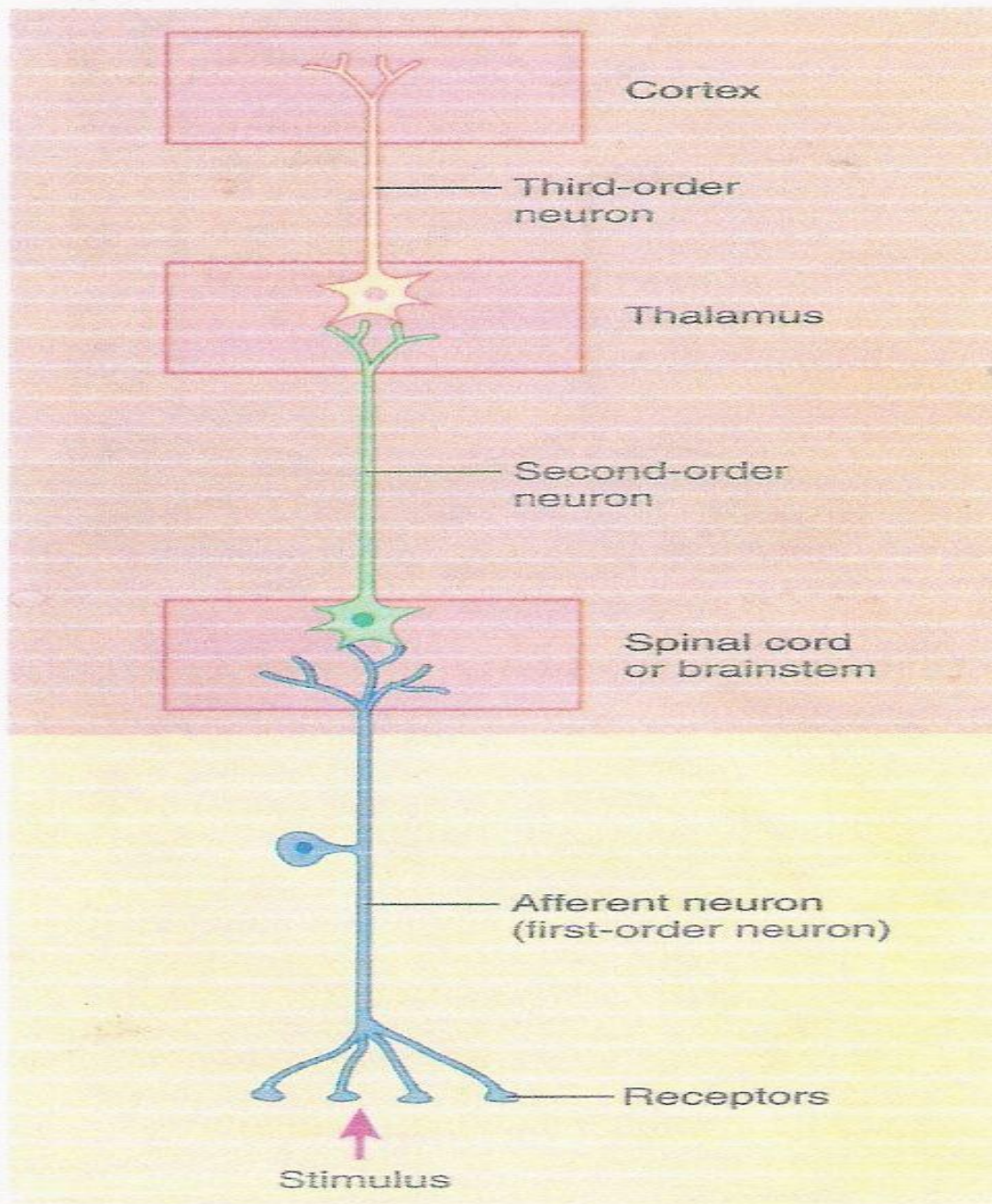
1. Detects environmental changes
2. Transmits the detected changes to CNS sensory areas for processing

Components of the Sensory System

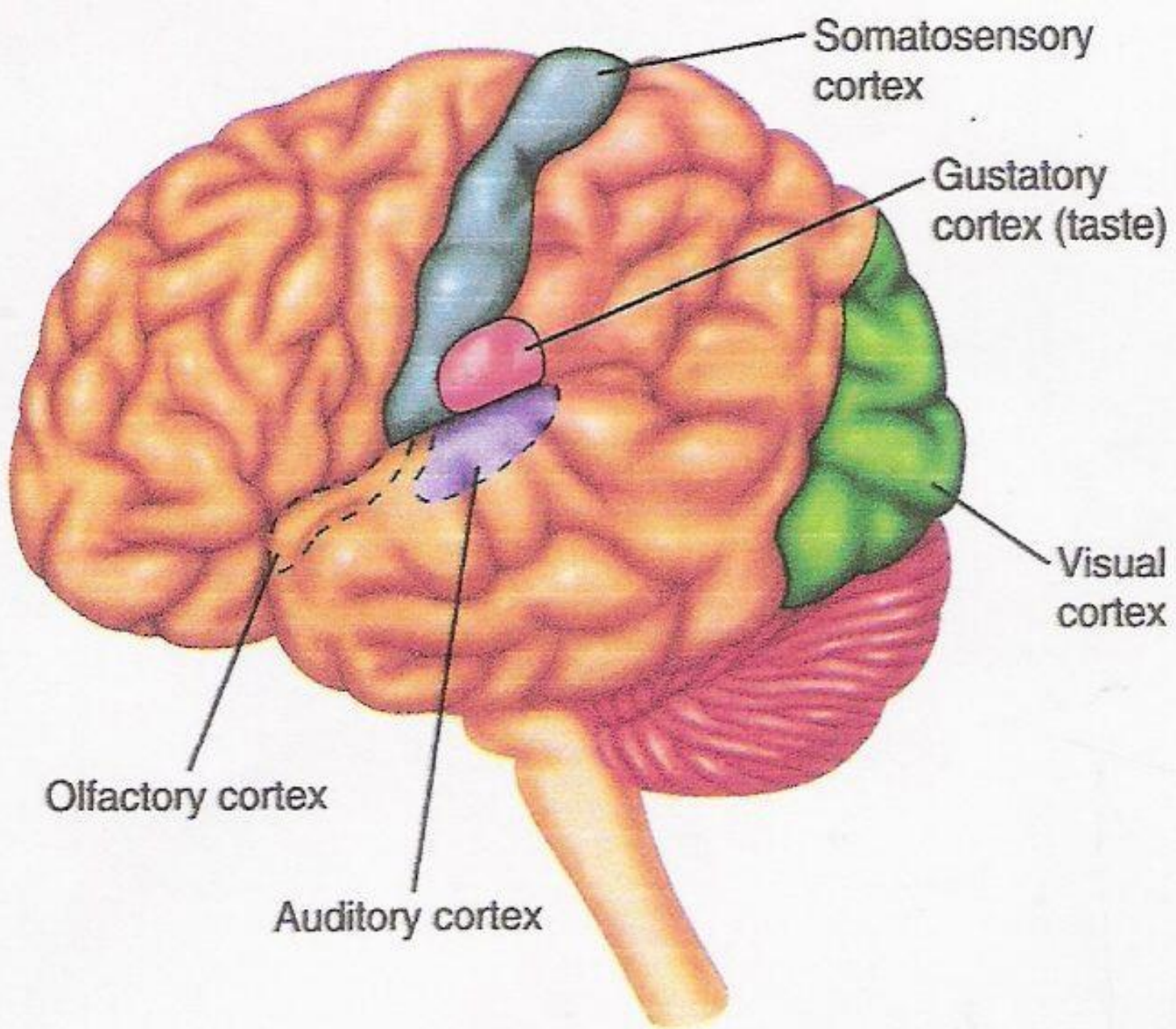
1. Receptors
2. Afferent pathways
3. Sensory areas in the CNS

Central
Nervous
System

Peripheral
Nervous
System



Generalized pathway for sensory systems.



Sensory areas of the cerebral cortex.

Receptors

Definition: Part of a neuron or specialized cell which converts energy into an action potential in a sensory nerve.

Properties of receptors:

1. Specificity: Each type of receptor is most sensitive to one specific form of energy (adequate stimulus)

2. Excitability: The receptor transforms the type of energy to which it is most sensitive to into a receptor potential

- a. Energy → Receptor potential (non-propagated partial depolarization)
- b. Summation of receptor potentials → Propagated action potential in a sensory nerve

3. Adaptation: Decrease in the rate of discharge of a receptor upon constant stimulation

Rapidly adapting	Slowly adapting	Non-adapting
Touch receptors	Baroreceptors Proprioceptors Temperature receptors	Pain receptors

Coding of Sensory Information

(Enables sensory areas in the brain to discriminate modality, locality and intensity of different sensory stimuli)

1. **Modality**: (The sensation perceived as a result of stimulation of a receptor)
 - a. Specific stimulus for each receptor
 - b. Specific pathway for each modality of sensation which ends in a specific area in the CNS

2. **Localization:** (Law of projection)

The sensation felt is referred to the locality of the receptor irrespective of where the sensory pathway leading from the receptor is stimulated

3. **Intensity:**

Signaled to the brain by changing the frequency of the action potential or the number of receptors stimulated

Classifications of Receptors

- | | |
|-------------------|---|
| 1. Teleceptors | Detects events at a distance |
| 2. Exteroceptors | Concerned with information about the immediate external environment |
| 3. Interoceptors | Concerned with information about the internal environment |
| 4. Proprioceptors | Concerned with information about the position of the body in space |
| 5. Nociceptors | Pain receptors |

Somatic Sensations

(Sensations transmitted by somatic nerves)

Classification:

- Mechanoreceptive senses
- Thermoreceptive senses
- Pain sense

Somatic receptors

	Mechanoreceptors (Touch, pressure, vibration & proprioceptors	Temperature receptors	Pain receptors
Type	-Free nerve endings - Encapsulated nerve endings -Expanded nerve endings -Nerve endings around hair follicles	Free nerve endings	Free nerve endings
Location	-Skin -Subcutaneous tissue -Muscle and joints -Around hair follicles	Skin	All over the body except: - brain tissue -lung alveoli - Liver parenchyma

Somatic receptors

	Mechanoreceptors (Touch, pressure, vibration & proprioceptors	Temperature receptors	Pain receptors
Method of stimulation	Mechanical displacement of body tissue	-Heat and cold	Tissue damage
Type of afferent nerve fibre by which impulses are transmitted	- A β -fibres (fine touch, pressure, vibration and proprioceptors) - C-fibres (crude touch and pressure)	-A δ fibres	-A δ fibres (fast pain) -C-fibres (slow pain)

